Hewlett Packard Enterprise
(2.30 GHz, Intel Xeon Gold 6140)

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Software
OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Firmware: HPE BIOS Version U41 06/15/2018 released Jun-2018
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None

Hardware
CPU Name: Intel Xeon Gold 6140
Max MHz.: 3700
Nominal: 2300
Enabled: 18 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 24.75 MB I+D on chip per chip
Other: None
Memory: 96 GB (12 x 8 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 480 GB SATA SSD
Other: None

SPECrates2017_fp_base = 99.8
SPECrates2017_fp_peak = Not Run

Test Date: Aug-2018
Hardware Availability: Jun-2018
Software Availability: May-2018
SPEC CPU2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen10
(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 99.8
SPECrate2017_fp_peak = Not Run

Results Table

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<tr>
<th>Benchmark</th>
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</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
IRQ balance service was stopped using "service irqbalance stop"
Tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"
VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:

sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
umactl --interleave=all runcpu <etc>"

General Notes

Environment variables set by runcpu before the start of the run:

(Continued on next page)
**SPEC CPU2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML350 Gen10  
(2.30 GHz, Intel Xeon Gold 6140)

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<th>SPECrate2017_fp_base</th>
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<tr>
<td>99.8</td>
<td>Not Run</td>
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</tbody>
</table>

**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE

### General Notes (Continued)

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.  
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.  
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

### Platform Notes

**BIOS Configuration:**  
Workload Profile set to General Throughput Compute  
Memory Patrol Scrubbing set to Disabled  
LLC Prefetch set to Enabled  
LLC Dead Line Allocation set to Disabled  
Stale A to S set to Disabled  
Minimum Processor Idle Power Core C-State set to C1E State  
Thermal Configuration set to Maximum Cooling  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-02jc Tue Aug 7 02:11:51 2018

SUT (System Under Test) info as seen by some common utilities.  
For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo

- model name : Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz  
  - 1 "physical id"s (chips)  
  - 36 "processors"  
  - cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)  
    - cpu cores : 18  
    - siblings : 36  
    - physical 0: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:

- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 36  
- On-line CPU(s) list: 0-35  
- Thread(s) per core: 2  
- Core(s) per socket: 18

(Continued on next page)
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Tested by: HPE
Test Date: Aug-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

Platform Notes (Continued)

Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
Stepping: 4
CPU MHz: 2294.616
BogoMIPS: 4589.23
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-8,18-26
NUMA node1 CPU(s): 9-17,27-35
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpre pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epbi invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser tpr_shadow vmx
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mxp avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsaves xsave xgetbv1 cqm_llc cqm_occup_llc pku ospke

/proc/cpuinfo cache data
  cache size : 25344 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 18 19 20 21 22 23 24 25 26
  node 0 size: 47882 MB
  node 0 free: 47356 MB
  node 1 cpus: 9 10 11 12 13 14 15 16 17 27 28 29 30 31 32 33 34 35
  node 1 size: 48262 MB
  node 1 free: 47934 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 98451836 kB
  HugePages_Total: 0

(Continued on next page)
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Platform Notes (Continued)

Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
os-release:
    NAME="SLES"
    VERSION="12-SP3"
    VERSION_ID="12.3"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
    Linux linux-02jc 4.4.131-94.25-default #1 SMP Mon May 7 11:22:19 UTC 2018 (9700bac)
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Aug 7 02:04

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 405G 9.9G 395G 3% /home

Additional information from dmidecode follows. WARNING: Use caution when you interpret
this section. The 'dmidecode' program reads system data which is "intended to allow
hardware to be accurately determined", but the intent may not be met, as there are
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
    BIOS HPE U41 06/15/2018
    Memory:
        12x UNKNOWN NOT AVAILABLE
        12x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666

    (End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of
memory is 96 GB and the dmidecode description should have one line reading as:
12x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666
COMPILER VERSION NOTES

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CC  511.povray_r(base) 526.blender_r(base)
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icpc (ICC) 18.0.2 20180210
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icc (ICC) 18.0.2 20180210
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FC  507.cactuBSSN_r(base)
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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
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ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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icc (ICC) 18.0.2 20180210
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Compiler Version Notes (Continued)
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
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Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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